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ABSTRACT

In 1981 a study was conducted at Kings River Community College to determine whether there were student characteristics that could help predict success in a college-level calculus course (Math Analysis I). Subjects for the study included all students enrolled in Math Analysis I in fall 1979 or fall 1980. Student records were examined to establish year of high school graduation, high school attended, placement test taken and math score, high school grade point average (GPA), high school math courses and grades, college units taken prior to Math Analysis I, GPA of college courses before Math Analysis I, and other college math courses and grades. A C grade or better in Math Analysis I was used as the measure of success. The study revealed that students had a less than 50% chance of succeeding in Math Analysis I if they: (1) scored less than the 94th percentile on a math achievement test; (2) had less than a 3.0 GPA in high school; (3) received less than a B in any high school math class; (4) received a grade of less than B in any other college math course; or (5) had less than a 3.0 college GPA. The Math Analysis I instructor suggested that high risk students be encouraged to take Trigonometry in the fall semester, College Algebra in the spring semester, and then, if successful, take Math Analysis I the following fall. (KL)

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MATH COURSES SURVEY

MATH 5A

MATH ANALYSIS I

KINGS RIVER COMMUNITY COLLEGE

Reedley, California

October 16, 1981

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MATH COURSES SURVEY

MATH 5A

QUESTION

Is there any characteristic of students that could help predict the possibility of success in Math 5A?

PROCEDURE

Instructor rosters were used to establish which students were enrolled in Math 5A and to determine grades given for the course. Students in the fall, 1979, and fall, 1980 classes were used, yielding a total N of 73. Control cards were checked for year of high school graduation, high school attended, placement test taken and math score, and high school grade point average. Admission packets were checked for high school math courses and grades. College transcripts were checked for college units taken prior to Math 5A, grade point average of college courses taken before Math 5A, and college math courses and grades taken before Math 5A.

RESULTS

1. High school and year of graduation - all but three of the 73 students were recent high school graduates. Therefore that factor had no significance. Ten high schools had two or more students in Math 5A, but only three had more than four students. It would be meaningless on the basis of insufficient numbers for those high schools with few students enrolled in Math 5A to identify any whose students were not well prepared. The three remaining schools had a good success/fail ratio; Dinuba, 7/1, Immanuel 5/2, and Reedley 13/5. If this were examined over a period of years to get sufficient N for high schools, then perhaps a pattern might emerge.

2. CGP(E), SAT, ACT scores - tabulation of scores provided the following information: (success defined as earning grade C or better)

	Successful	Unsuccessful	Total
93%ile or below	16*	20	36
94%ile or above	14	6	20
TOTAL	30	26	56

$$x^2 = \frac{(14 \cdot 20 - 16 \cdot 6)^2 56}{30 \cdot 26 \cdot 20 \cdot 36} = 3.375,$$ sig. at 10% level of confidence

Those scoring below the 94%ile had less than a 50/50 chance of succeeding.

*Two students were eliminated from this statistic because they were foreign students, and they took the wrong section of the CGP math test.

3. High school grade point average - tabulation provided the following information:

	Successful	Unsuccessful	Total
HS gpa 3.0 or higher	32	17	49
HS gpa lower than 3.0	1	10	11
TOTALS	33	37	60

$$x^2 = \frac{(32 \cdot 10 - 17 \cdot 1)^2 60}{33 \cdot 27 \cdot 11 \cdot 49} = 11.47,$$ sig. at 1% level of confidence.

Those with less than a 3.0 grade point average in high school had less than a 50/50 chance of succeeding.

4. Grades in high school math courses - tabulation provided the following information:

	Successful	Unsuccessful	Total
All HS math A or B	26	8	34
One or more HS math below B	11	20	31
TOTALS	37	28	65

$$x^2 = \frac{(20 \cdot 26 - 8 \cdot 11)^2 65}{37 \cdot 28 \cdot 31 \cdot 34} = 11.1,$$ sig. at 1% level of confidence.

Those with any high school math grade below B had less than a 50/50 chance of succeeding.

5. College units taken prior to Math 5A - tabulation provided the following information:

	Successful	Unsuccessful	Total
No college units	18	10	28
Any college units	24	21	45
TOTALS	42	31	73

$$x^2 = \frac{(21 \cdot 18 - 24 \cdot 10)^2 73}{42 \cdot 31 \cdot 45 \cdot 28} = .0847,$$ no significant difference.

Students in both categories had better than a 50/50 chance of succeeding.

6. College grade point average in courses taken before Math 5A - tabulation provided the following information:

	Successful	Unsuccessful	Total
College GPA 3.0 or higher	11	7	18
College GPA lower than 3.0	13	14	27
TOTALS	24	21	45

$$x^2 = \frac{(14 \cdot 11 - 13 \cdot 7)^2 45}{24 \cdot 21 \cdot 27 \cdot 18} = .729,$$ no significant difference.

Those who had a college grade point average of less than 3.0 prior to taking Math 5A had less than a 50/50 chance of succeeding.

7. Grades in college math courses taken before Math 5A - tabulation provided the following information:

	Successful	Unsuccessful	Total
All college math A or B	9	3	12
Some college math below B	8	12	20
TOTALS	17	15	32

$$x^2 = \frac{(9 \cdot 12 - 3 \cdot 8)^2 32}{17 \cdot 15 \cdot 20 \cdot 12} = 3.689,$$ sig. at 10% level of confidence.

Those with less than B grades in any math course in college prior to Math 5A had less than a 50/50 chance of succeeding.

SUMMARY

Based on the above criteria, students have less than a 50/50 chance of succeeding in Math 5A if:

1. They score less than the 94th percentile on the math test of SAT, ACT, or CGP(E).
2. They have less than a 3.0 grade point average in high school.
3. They have less than B in any high school math class.
4. They have grades of less than B in any college math class taken prior to Math 5A.
5. They have less than a 3.0 college grade point average in courses taken prior to Math 5A.

A tabulation of the number of factors for students in the two classes examined provided the following information:

No. of factors	Unsuccessful	Successful
0	1	16
1	8	10
2	5	5
3	7	5
4	8	1
5	1	0

Students with:

	Unsuccessful	Successful	Total
0,1,2 factors	14	31	45
4,5,6 factors	16	6	22
TOTALS	30	37	67*

$x^2 = \frac{(16 \cdot 31 - 6 \cdot 14)^2 67}{30 \cdot 37 \cdot 22 \cdot 45} = 10.349$, *Six foreign students eliminated from data. Some had no factors available, some no more than 2 of the 5. Significant at 1% level of confidence.

Students with three or more factors had less than a 50/50 chance of succeeding. The Math 5A instructor suggested that high risk students be encouraged to take Math C in the fall semester, Math 1 in the spring semester, and then, if successful, take Math 5A the following fall.

RMC:bjs

APPENDIX

Math C -- Trigonometry

Math 1 -- College Algebra (prerequisite of Math 5A)

Math 5A -- Math Analysis I (beginning course in calculus)

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